

Response surface optimisation for the production of antioxidant hydrolysates from stone fish protein using bromelain

ABSTRACT

Protein hydrolysates produced from different food sources exhibit therapeutic potential and can be used in the management of chronic diseases. This study was targeted to optimise the conditions for the hydrolysis of stone fish protein to produce antioxidant hydrolysates using central composite design (CCD) by response surface methodology (RSM). The stone fish protein was hydrolysed under the optimum predicted conditions defined by pH (6.5), temperature (54°C), E/S ratio (1.5%), and hydrolysis time (360 min). The hydrolysates were then evaluated for 2,2-diphenyl-1-picrylhydrazyl radical (DPPH•) scavenging activity and ferrous ion- (Fe²⁺)-chelating activity. Results validation showed no significant difference between the experimental values of DPPH• scavenging activity (48.94%) and Fe²⁺-chelating activity (25.12%) obtained at 54.62% degree of hydrolysis (DH) compared to their corresponding predicted values of 49.79% and 24.08% at 53.08% DH, respectively. The hydrolysates demonstrated non-Newtonian behavior () with stronger shear-thinning effect and higher viscosities at increasing concentration. Thus, RSM can be considered as a promising strategy to optimise the production of stone fish protein hydrolysates containing antioxidant peptides. It is hoped that this finding will enhance the potential of stone fish protein hydrolysates (SHs) as therapeutic bioactive ingredient in functional foods development.